## (19) World Intellectual Property Organization International Bureau





(43) International Publication Date 16 June 2005 (16.06.2005)

PCT

## (10) International Publication Number WO 2005/054540 A1

- (51) International Patent Classification<sup>7</sup>: C23C 14/14, 24/02, 14/06, 16/02, 28/00, F16C 33/12, 33/14
- (21) International Application Number:

PCT/EP2004/013676

(22) International Filing Date:

30 November 2004 (30.11.2004)

(25) Filing Language:

English

(26) Publication Language:

English

- (30) Priority Data:
  PCT/EP03/50923 2 December 2003 (02.12.2003) EP
- (71) Applicant (for all designated States except US): NV BEKAERT SA [BE/BE]; Bekaertstraat 2, B-8550 Zwevegem (BE).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): VENKATRAMAN, Chandra [IN/US]; 96 Crown Royal Drive, Williamsville, NY 14221 (US). MAJERONI, Keith [US/US]; 8057 Maple Road, Newstead, NY 14101 (US). KESTER, Daniel [US/US]; 104 Deer Run Road, Williamsville, NY 14221 (US).

- (74) Agent: MESSELY, Marc; NV Bekaert SA, Bekaertstraat 2, B-8550 Zwevegem (BE).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

## Published:

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A LAYERED STRUCTURE

(57) Abstract: The invention relates to a layered structure comprising a first intermediate layer, said first intermediate layer comprising at least one element of group IVB, group VB or group VIB; a second intermediate layer deposited on top of said first intermediate layer, said second intermediate layer comprising a diamond-like nanocomposite composition; a diamond-like carbon layer deposited on top of said second intermediate layer. The invention further relates to the use of a substrate coated with such a layered structure for high shear and/or high impact applications and to a method to cover a substrate with such a layered structure.